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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Feb-2021

SIGNALS AND SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Check whether the following systems are causal or not? 6M
 (i) $y(t)=x_2(t)+x(t-3)$ (ii) $y(t)=x(t+2)$ (iii) $y(t)=x(-2t)$
 b Sketch the following signals 6M
 (i) $u(-t+2)$ (ii) $-4r(t)$ (iii) $r(-t+3)$

OR

- 2 a Discuss about LTI system. 6M
 b Explain the classification of signals with examples. 6M

UNIT-II

- 3 a Find the Fourier transform of the following signals 6M
 (i) $x(t)=\text{Sinc}(t)$ (ii) $x(t)=e^{-at}u(t)$
 b State and prove the convolution and multiplication properties of Continuous time Fourier transform? 6M

OR

- 4 a State and prove the time shifting and frequency shifting properties of discrete time Fourier Transform. 6M
 b Find the inverse Fourier transform of 6M

$$X(\omega) = \frac{4j\omega+6}{(j\omega)^2+6j\omega+8}$$

UNIT-III

- 5 a Derive the transfer function and impulse response of an LTI system. 6M
 b State and prove sampling theorem for band limited signals. 6M
- OR
- 6 a Let the system function of an LTI system be $1/(j\omega+2)$. what is the output of the system for an input $0.8^t u(t)$? 8M
 b Discuss about aliasing 4M

UNIT-IV

- 7 a Show that R(r) and PSD form Fourier transform pair. 6M
 b Explain the detection of periodic signals in the presence of noise by cross correlation. 6M
- OR
- 8 a Find the Convolution of $x_1(t) = u(t)$ and $x_2(t) = u(t+2)$ 6M
 b State and prove the Parseval's theorem for energy signal. 6M

UNIT-V

- 9 a State and prove initial and final value theorems of Z-transform 6M
 b Find the Laplace transform of i) $x(t) = e^{-at} \cos(\omega_0 t) u(t)$ ii) $x(t) = te^{-at} u(t)$ 6M

OR

- 10 a State and prove the i) integration in time ii) differentiation in time properties of Laplace transform. 6M
 b Determine the inverse Z-Transform of $X(z) = \log_e \left(\frac{1}{1-az^{-1}} \right)$; ROC $|Z|>a$. 6M

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